

Research Summary

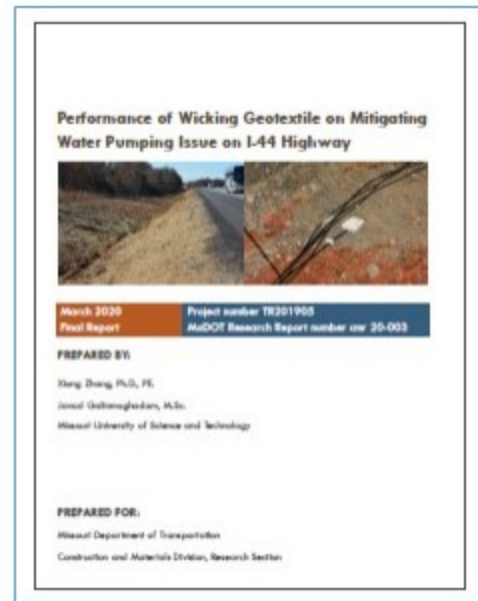
PERFORMANCE OF WICKING GEOTEXTILE ON MITIGATING WATER PUMPING ISSUE ON I-44 HIGHWAY

A newly developed wicking geotextile with unique drainage ability was investigated for its ability to mitigate pumping along pavement shoulders. To evaluate the product's ability to reduce moisture levels in base course material, a field test site was constructed and instrumented at milepost 117.2 along Interstate 44 in Missouri.



Figure 1: Section of shoulder along Interstate 44 after construction was completed.

In order to compare the different potential configurations of the wicking geotextile and find the most effective placement to reduce moisture content, the test site was divided into three sections. The first section was a control section without installation of wicking geotextile. Two



other sections were constructed by placing one layer of wicking geotextile on top of a clayey subgrade along the road shoulder, one with a vertical portion of geotextile just below the joint between the shoulder and pavement, and one without.

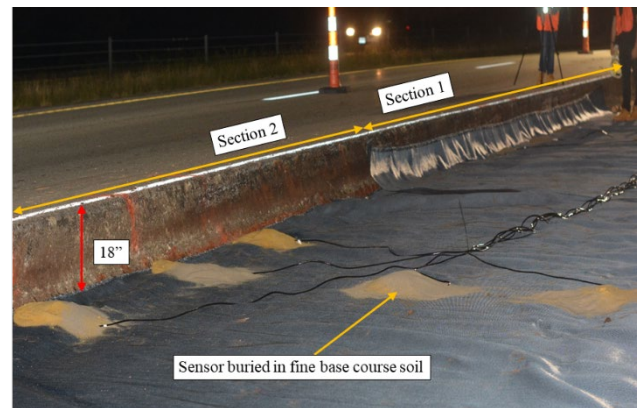


Figure 2: Sections 1 and 2 during construction, placement of wicking geotextile and instrumentation.

Construction of the test site finished on September 27, 2018, and continuous monitoring of all sections was performed using moisture and temperature sensors embedded in the subgrade structure.

Results obtained from the control section showed that the moisture content increased quickly during the first rainfall event after its

construction and never reduced to its initial condition. On the other hand, the results of test sections treated with wicking geotextile clearly demonstrated that the installation of wicking

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geotextile had significantly reduced the moisture content in the pavements structure and was beneficial to the mitigation of the pumping issue.

The average moisture content reduction was 5-10% at the improved sections compared to the control section. Some small-scale laboratory tests were also performed to investigate the drainage performance of wicking geotextile in a more controlled environment. The laboratory test results were consistent with the field monitoring results. It was also found that use of French drain was not as effective as the application of wicking geotextile in reducing moisture content in the pavement shoulder for pumping mitigation purposes.



Figure 3: Filled test box used to simulate field conditions and evaluate geotextile performance against French drain setup in laboratory.

Project Information

PROJECT NAME: TR201905 - Use of H2Ri to Mitigate Pumping in Concrete Pavement Shoulder

PROJECT START/END DATE: September 2018 – February 2020

PROJECT COST: \$37,403

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PRINCIPAL INVESTIGATOR: Dr. Xiong Zhang

REPORT NAME: Performance of Wicking Geotextile on Mitigating Water Pumping Issue on I-44 Highway

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NAME: Bill Stone, Former Research Administrator

CONTACT INFORMATION:

Jennifer Harper
Research Director
Missouri Dept. of Transportation
1617 Missouri Blvd.
Jefferson City, MO 65109
(573) 526-3636
Jennifer.Harper@modot.mo.gov

